DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 69.28

WELDING INSPECTION REPORT

Resident Engineer: Pursell, Gary
Address: 333 Burma Road
City: Oakland, CA 94607

Report No: WIR-000694
Date Inspected: 18-Oct-2007

Project Name: SAS Superstructure
Prime Contractor: American Bridge/Fluor Enterprises, a JV
Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

OSM Arrival Time: 630
OSM Departure Time: 1730
Location: Shanghai, China

CWI Name: Fu Guo Gang

Inspected CWI report:	☐ Yes	☑ No	☐ N/A	**CWI Present:**	☑ Yes	☐ No	
Electrode to specification:	☑ Yes	☐ No	☐ N/A	**Rod Oven in Use:**	☑ Yes	☐ No	☐ N/A
Qualified Welders:	☑ Yes	☐ No	☐ N/A	**Weld Procedures Followed:**	☑ Yes	☐ No	☐ N/A
Approved Drawings:	☑ Yes	☐ No	☐ N/A	**Verified Joint Fit-up:**	☑ Yes	☐ No	☐ N/A
				Approved WPS:	☑ Yes	☐ No	☐ N/A
				Delayed / Cancelled:	☐ Yes	☑ No	☐ N/A

Bridge No: 34-0006
Component: OBG Weld trial

Summary of Items Observed:

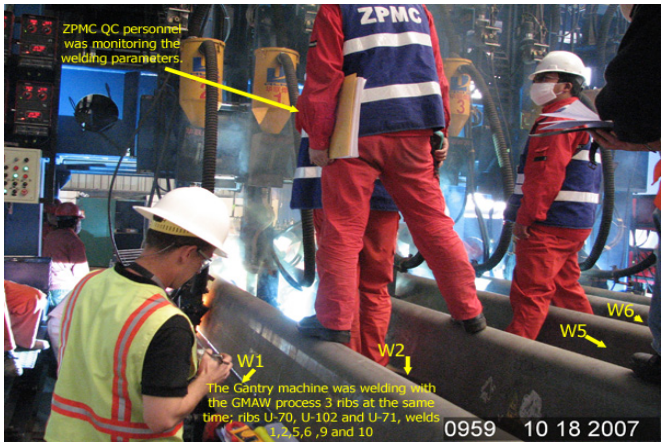
CALTRANS Quality Assurance (QA) Inspector, Alfredo Acuna was present for the fabrication of the Orthotropic Box girder Weld Trial scheduled for this project at the ZPMC facility in Shanghai, China for the San Francisco Oakland Bay Self Anchored Suspension Bridge.

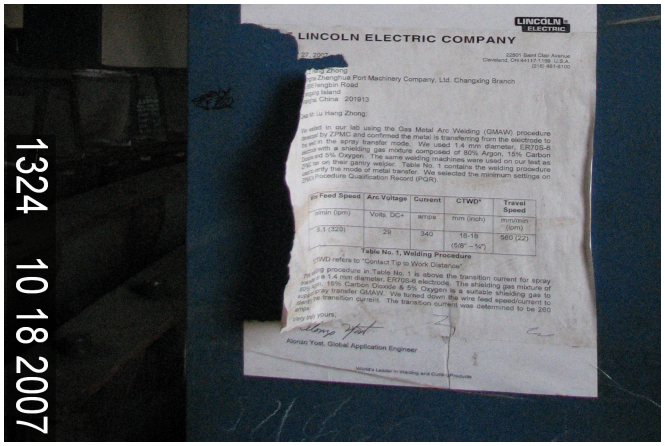
The QA inspector witnessed the weld trial at the junction of the U-ribs and the deck plate for the Orthotropic Box Girder (OBG) Mock-up, ABF representatives Mr. Steve Lawton, Mr. Craig Knops, Mr. Peter Ferguson , Mr. Dave Mcquaid, ZPMC representatives Mr. Lu Jian Hua and Mr. Hu Gang and Caltrans representatives Mr. Robert Cuellar, Mr. Dave McClary, Mr. Pat Lowry, Mr. Pete Siegenthaler, Mr. Keith Devonport, Mr. Alistair Melville, Mr. Ady Velasco, Mr. Mike Hasler, Mr. Larry Viars and Mr. Sean Eagen were present at the OBG fabrication shop.

The test started at approximately 0845 hours. The root pass was welded with the automatic Gantry Lincoln machine with the gas metal arc welding (GMAW)process. The welding parameters target on the ZPMC's Welding procedure specification (WPS)WPS-B-T-2342-U1(Urib) for the GMAW process were confirmed by Lincoln Electric Company as metal transfering with spray transfer mode(see letter from Lincoln on the photograph below). The cover pass was welded submerged arc welding (SAW) process using the target values listed on the WPS-B-T-2322-U1(Urib). The QA inspector verified the amperages, voltages on the control panel and the actual travel speed with the assistances of Mr. Larry Viars. The welding parameters recorded by the QA inspector appeared to be in general compliance with the WPSs target values.

ZPMC SAW welder operators performing welding operations on the OBG weld trail were listed as follows: Zhang Shao Hui at the U-ribs U-70 and U-74 weld joints # 1 and 3, Tang Liang welding at the U-ribs U-70 and U-74 weld joints # 2 and 4, Fen Chuan Hong at the U-rib U-102 weld joint # 5, Jing Ting welding at the U-rib 104 weld joint # 6, Xu Guo Yin welding at the U-ribs U-104 and U-71 weld joints # 7 and 10 and welder Son Yin Shu

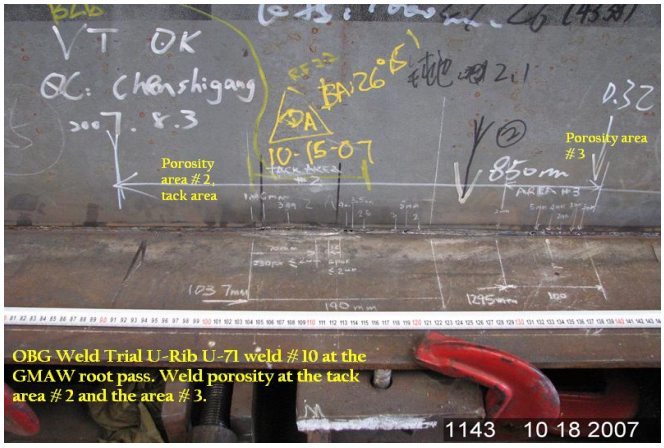
performing welding operations at the U-ribs U-104 and U-71 weld joints # 8 and 9.

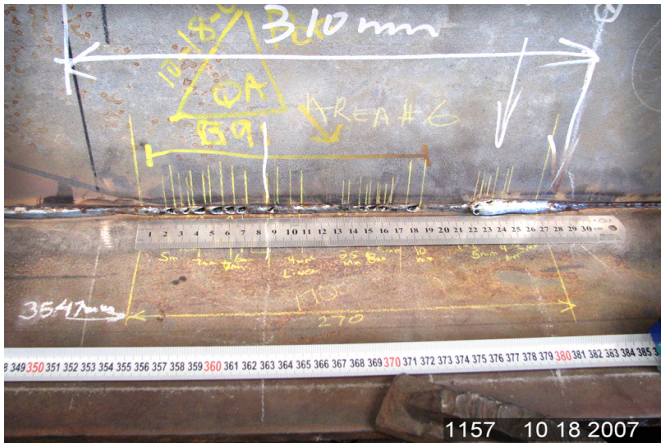


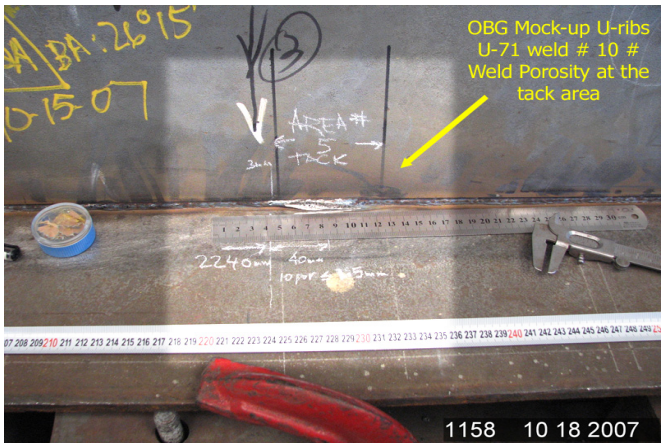


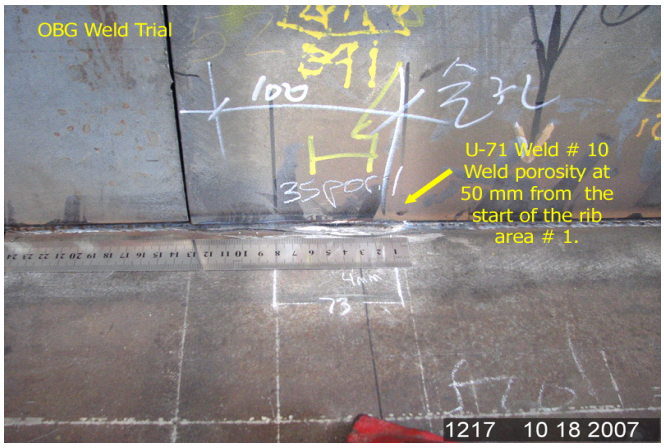
Item	Description	WBS	Dwg No.	Status
1	GMAW Weld Porosity at the weld # 10, U-Rib 71			

The QA inspector observed excessive weld porosity at the first 4 meters at the U-rib U71, weld # 10. The weld porosity was found on six (6) different areas. Areas 1 through 4 were located at the first 2 meters and areas 5 and 6 were located after ZPMC restarted the second 2 meters. The digital photographs below depict the approximately locations and sizes of the defects with respect to the end of the deck plate opposite to the hand hole.









2 Tack welds and gaps verifications after positioning the panel over the negative deflection jig

In random inspection to the tack welds, the QA inspector found that tacks welds appeared to be ground smooth in accordance with the special provisions. In addition, the QA inspector measured the effective throat of the tacks in random locations. The QA inspector found an average effective throat of approximately 6 to 7 mm.

The QA inspector observed that after moving the deck plate over the negative deflection jig, some of the gaps in localized areas were measured over 0.6 mm (the maximum gap between the deck and the U-rib per ZPMC fabrication procedure is 0.5 mm).

4 Automatic Gantry welding Machine

Before the welding started, the QA inspector had a conversation with the ZPMC representative Mr. Lu Jian Hua. The QA inspector asked Mr. Lu Jian Hua about the calibration records or sticker showing that the Gantry welding machine had been calibrated by ZPMC. Mr. Lu Jian Hua relayed ZPMC had not calibrated yet but the Gantry machine was bought brand new and ZPMC has the certification from the manufacturer (Lincoln Electric Company)showing the calibration records. The QA inspector had a conversation with Senior Task leader Mr. David McClary the QA inspector brought to Mr. David McClary attention that Mr. Lu Jian Hua relayed to the QA inspector that the Gantry machine had not been calibrated by ZPMC after ZPMC purchased the machine.

The QA inspector observed ZPMC performing adjustment to the Gantry machine after welding with GMAW process with excessive porosity on six different areas at the first 4 meters of weld on the welding head # 5, weld # 10.

The QA inspector observed ZPMC performing adjustment to the circuity of the Gantry machine after a machine malfunction at two welding heads caused deep gouging on the base metal. The gouging areas occurred when ZPMC was welding the cover pass with the submerged arc welding (SAW)process. The QA inspector had a conversation

with ABF representative Mr. Peter Ferguson. The QA inspector asked about the cause of the malfunction. Mr. Peter Ferguson relayed to the QA inspector that when the operator at the control panel stopped the Gantry welding machine, some of the welding heads were still continuing passing current thru the piece.

The photograph below show ZPMC maintenance personnel performing adjustment to the control panel of the Gantry.

Summary of Conversations:

As noted above.

Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Mazen Wahbeh, (818) 292-0659, who represents the Office of Structural Materials for your project.

Inspected By:	Acuna,Alfredo	Quality Assurance Inspector
Reviewed By:	Cuellar,Robert	QA Reviewer